14th Conf. Agric. Develop. Res., Fac. of Agric., Ain Shams Univ., March, 2019., Cairo, Egypt
Special Issue, 27(1), 281 - 287, 2019
Website: http://strategy-plan.asu.edu.eg/AUJASCI/

RESPONSE OF SOME MAIZE VARIETIES (*Zea mays* L.) TO BORON FOLIAR APPLICATION UNDER SIWA OASIS CONDITIONS

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Received 20 February, 2019, Accepted 31 March, 2019

ABSTRACT

Two field experiments were conducted in two successive seasons; 2017 and 2018 at Bahi El-Din, Siwa Oasis, Egypt, to study the effect of four boron levels (0, 23, 46 and 69 ppm) as foliar application on yield and its components of five maize (Zea mays L.) hybrids (Single Crosses 124, 168, Three Way Crosses 310, 324 and 352). The experimental design was perpendicular strips plot with three replicates. Results indicated that effect of boron and hybrids on plant height, no. of grains/row, ear length, no. of rows/ear, ear diameter, 100-grain weight, grain, ear and stover yields (kg fed^{-1}) were significant. Maize hybrid S.C. 124 produced the highest values of 100-grain wt., grain and ear yields per fed. Maximum no. of grains/row, ear length and stover yield fed^{-1} were recorded by TWC 324 hybrid. While, TWC 352 hybrid surpassed in no. of rows/ear and ear diameter. Foliar application by 69 ppm boron significantly produced more grains per row and ear, 100-grain wt. and grain yield/fed. Interactions were significant for all studied traits, except no. of grains/row and ear diameter. Thus, it could be concluded that applying 69 ppm boron as foliar for S.C.124 hybrid could be used successfully for improving maize productivity under Siwa Oasis conditions.

Key Word: Maize hybrids, Boron spraying, Siwa Oasis

INTRODUCTION

Siwa Oasis is located between the Qattara Depression and Egyptian sand sea of the Libyan Desert, nearly 50 km east of the Libyan border, and 300 km south west of Matroh governorate. The main activity in Siwa Oasis is agriculture, depending on groundwater using flood irrigation system in the most agricultural areas **(Hafez et al 2015).**

Maize (*Zea mays* L.) is a main cereal crop grown in summer and late-summer seasons in Egypt. It used as animal and poultry feed and maize flour which has been recommended to be mixed with wheat flour to overcome the shortage of wheat production in Egypt.

Maize productivity could be increased by cultivating high yielding varieties and improving its cultural practices. Boron application is one of essential micronutrients which correlates well with hot water soluble in soil extract. Boron deficiencies are mostly found in poor soils, low organic contents and higher soil pH (**Mengel and Kirkby, 2001**). Boron roles include, cell wall structure, membrane stability, sugar transportation and phenol, carbohydrate, nucleic acid and IAA metabolism; pollen germination, flowering and seed development (**Marschner, 1995, Brown et al 2002 and Wang et al 2003).**

In hot and dry regions, maize productivity influenced by higher temperature. **Maria Pilar** and **Johnson (1980)** found that temperatures above 35ºC can reduce pollen germination of many maize cultivars to zero percentage and resulted in poor kernel set, following decreasing yield. In addition, **Muchow (1990)** detected higher temperature from 27º up 33ºC during pollen period resulted yield loss around 10% of maize and attained to 42% at 38º C.

Many workers documented maize hybrids variations regarding yield and it's contributing traits, **Abdou, et al (2012)** found that the TWC 352 hybrid scored higher number of rows/ear and heavier grain index when compared with other tested hybrids. On the other hand, SC 166 maize hybrid significantly possessed greater than both SC 162 and TWC 352 ones in most agronomic parameters as ear length, number of grains/row, ear weight,

grain weight/ear, and final yields per fad. Similar trends were reported by **Attia, and El-Dissoky (2016) and Awadalla and Morsy (2016).**

Therefore, under Siwa Oasis region, many efforts must be done to maximize maize production by testing more genotypes and different mineral foliar application such as boron spraying.

MATERIALS AND METHODS

Two field experiments were carried out at Bahi El-Din in Siwa Oasis, Matrouh Governorate, during two summer seasons of 2017 and 2018, to study the effect of foliar applications of boron (without boron "as control", 23, 46 and 69 ppm boron) on yield and yield components of four maize hybrids (SC 124, TWC 310, TWC 324, as white grains, SC168 and TWC 352, as yellow grains). Boron was applied as foliar application in the form of borax ($Na_2B_4O_7.10\ H_2O$, 11.35% B), after 40 and 55 days from sowing date. Meteorological data recorded from sowing to harvest dates as shown in **Table (1).**

Table 1. Meteorological data of the two growing seasons (2017 and 2018) at Siwa location. Latitude: 29.2, Longitude: 25.31 Altitude: -13

Months	1st season (2017)				2nd season (2018)			
	Temp. (°C)		Relative Humidity	Total Rain	Temp. (°C)		Relative Humidity	Total Rain
	Max.	Min.	(%)		Max.	Min.	(%)	
May	42	16	32	0.00	45	16	33	0.00
June	45	19	32	0.00	44	19	32	0.00
July	43	22	33	0.00	44	22	37	0.00
Aug.	40	22	37	0.00	40	24	40	0.00
Sept.	41	20	42	0.00	38	20	43	0.00
Oct.	33	13	47	0.00	35	13	47	0.00

Soil sample was collected from the upper 30 cm soil surface before planting and the physi-chemical analysis of the soil showed that the soil is loamy sand in texture; sand (82.30%), silt (9.20%), clay (8.50%), pH (7.78), organic matter (0.5%), Ec (8.99 meq/100g soil), available N (43.9 ppm), P (4.56ppm) and K (84 ppm), available micro nutrients in soil were 8.25, 5.15, 0.74, 0.26 and 0.08 ppm for Fe, Mn, Zn, Cu and B, respectively.

Maize grains were obtained from Maize Breeding Section, Agriculture Research Center, Ministry of Agric. Whereas, SC 124 and SC168 was a single cross but TWC-310 , TWC-324 and TWC-352 are Three –way crosses with white color for expect SC 168 and TWC-352 which were yellow color. Grains cultivars were sown at 23 May in the two growing seasons, 2017 and 2018 at a rate of 15 kg fed^{-1}.

The experimental design was perpendicular strips plot with four replicates. The vertical strips plot, were allocated to Boron foliar treatments, while the horizontal strips plots were assigned for maize hybrids. Each experimental unit area was 10.5 m2 (1/400 feddan). All common agricultural practices were adopted throughout the two experimental seasons.

At harvest date, after 122 and 124 days from sowing in 2017 and 2018 seasons, respectively, ten plants were taken randomly from every treatment to determine the following characters: plant height (cm), no. of grains/row, ear length (cm), no. of rows/ear, ear diameter (cm), 100 -grain wt. (g), grain, ear and stover yields (kg fed^{-1}).

Statistical analysis

The obtained data were subjected to analysis of variance (ANOVA) according to **Snedecor and Cochran (1990)** at 5 % level of significance. The Combined analysis of the two seasons was done.

RESULTS AND DISCUSSION

1- Maize hybrids performance

Data presented in **Table (2)** showed that studied maize hybrids recorded significant differences in all characters, i.e. plant height, no. of grains/row, ear length, no. of rows/ear, ear diameter, 100-grain wt., grain, ear and Stover yields (kg fed^{-1}). However, S.C. 124 maize hybrid produced the maximum values in 100-grain wt., grain and ear yields (kg/fed.) as compared with the other studied hybrids. On the other hand, T.W.C. 324 hybrid gave the highest values of no. of grains/row, ear length and stover yield/fed. followed by S.C. 124 maize hybrid.

Regarding plant height, T.W.C. 310 scored the tallest one. While, T.W.C. 352 maize hybrid outnumbered other hybrids in no. of rows/ear and ear diameter.

Data in **Table (2)** revealed that S.C. 124 maize hybrid gave the highest grain yield/fed. as compared to other hybrids. This result may be attributed to a significant increase in 100-grain wt., ear yield/fed no. of grains/row, ear length and no. of rows/ear. Thus, the superiority of S.C. 124 maize

hybrid may be due to the gene make-up of the studied hybrids. Similar results were noticed by **El-Gizawy and Salem (2010)** who found that T.W.C. 352 hybrid scored the higher number of rows/ear as well as heavier grain index when compared with other two tested hybrids. On the other hand, S.C. 166 maize hybrid significantly possessed than both SC 162 and TWC 352 hybrid ones in most agronomic parameters of maize, being: ear length, number of grains/row, ear weight, grain weight/ear. Similar maize cultivar performance were documented by **Hassan (1998 & 1999)** under Siwa conditions, **Soliman, and Barakat (2006), Hassan et al (2008), Akram et al (2010), Abdul Aziz et al (2011), Ahmad et al (2011) and Abdou et al (2012), Abd El-Lateef and Bughdady (2017), Abd El-Lateef & Bughdady (2018) and Hassaan (2018).**

Table 2. Maize yield and its components as affected by maize hybrids (combined of 2017 and 2018 seasons).

Maize Cultivars	Plant height (cm)	No. of grains/row	Ear length (cm)	No. of rows/ear	Ear diameter (cm)	100 -grain weight (g)	Grain yield (kg fed^{-1}.)	Ear yield (kg fed^{-1}.)	Stover yield (kg fed^{-1}.)
S.C. 124	178.83	15.00	13.28	10.83	4.39	36.65	1568.56	2660.50	2280.17
S.C. 168	182.00	11.42	11.20	11.15	4.53	30.73	1097.00	1917.17	2197.83
T.W.C. 310	205.25	9.33	12.50	8.60	4.17	31.25	749.00	1050.50	2284.25
T.W.C. 324	205.17	15.75	13.73	9.63	4.47	33.36	1341.50	2245.25	2386.17
T.W.C. 352	168.92	12.00	11.57	11.87	4.52	28.16	1154.33	1998.00	2110.00
F test	**	**	**	**	**	**	**	**	**
LSD at 5%	2.29	0.74	0.07	0.70	0.06	0.42	54.41	73.84	63.93

2- Effect of boron foliar application

Data in **Table (3)** showed significant effects of boron foliar application on plant height, no. of grains/row, ear length, no. of rows/ear, ear diameter, 100-grain wt., grain, ear and stover yields per fed. The above mentioned yield attributes were significantly increased with increasing boron foliar application from zero up to 69 ppm. Grain yield tended to increase by 47.3, 118.4 and 194.0% over the control at 23, 46 and 69 ppm boron as foliar application, respectively. These increment in grain yield may be attributed to the increase of triangle yield attributes, i.e. no. of grains/row, no. of rows/ear and 100-grain wt. as shown in **Table (3).** These results proved the importance of boron application for increasing grain yield of maize as reported by **Walden, (1993)**, **Aydyn et al (2003), Sittichai Lordkaew et al (2010)**, **Marschner (1995), Brown et al (2002) and Wang et al (2003).** These results are in accordance with other studies by **Li & Liang (1997), Ray (1999), Ahmad et al (2009), Sittichai et al (2010), Shagholi et al (2013), Hamze & Florin (2014), Mekki (2015) and Attia & El-Dissoky (2016).**

3- The interaction effects

Interaction between maize hybrids and boron foliar application on yield and its components i.e. plant height, no. of ears/plant, ear diameter, no. of rows/ear, no. of grains/ear, grains wt./ear, 100-grain wt., grain yield/fed. and relative increase in grain yield over the control as combined of 2017 and 2018 seasons was presented in **Table (4).** Significant interaction was noticed for all the above mentioned traits except no. of grains/row and ear diameter.

Foliar application by the highest boron level gave the maximum values of no. of grains/row, 100-grain wt., grain and ear yields per fed. in S.C. 124 maize hybrid; no. of rows/ear, ear diameter and relative increase in grain yield over the control in S.C. 168 maize hybrid; stover yield/fed. in T.W.C. 310 maize hybrid; plant ht. and ear length and stover yield/fed. in T.W.C. 324 maize hybrid. Whereas, the minimum values of the most yield attributes were obtained from without boron application on T.W.C. 310 or T.W.C. 352 maize hybrid.

Table 3. Yield and its components of maize hybrids as affected by boron spraying (combined of 2017 and 2018 seasons).

Boron Foliar)	Plant height (cm)	No. of grains /row	Ear length (cm)	No. of rows/ear	Ear di-ameter (cm)	100-grain weight (g)	Grain yield (kg fed^{-1}.)	Ear yield (kg fed^{-1}.)	Stover yield (kg fed^{-1}.)
Without (B_0)	177.20	9.20	10.00	8.40	4.31	29.30	622.40	1204.27	1850.40
23 ppm (B_1)	185.73	11.27	12.08	9.59	4.39	31.59	916.53	1644.47	2183.07
46 ppm (B_2)	193.20	13.53	13.57	10.93	4.46	33.14	1359.27	2307.27	2396.93
69 ppm (B_3)	196.00	16.80	14.17	12.83	4.51	34.09	1830.13	2741.13	2576.33
F test	**	**	**	**	**	**	**	**	**
LSD at 5%	1.79	1.19	0.27	0.41	0.04	0.46	37.61	65.12	50.33

Table 4. Yield and its components as affected by the interaction between boron spraying and maize hybrids (combined of 2017 and 2018 seasons).

Interaction		Plant height (cm)	No. of grains/ row	Ear length (cm)	No. of rows/ear	Ear di-ameter (cm)	100-grain weight (g)	Grain yield (kg fed^{-1}.)	Ear yield (kg fed^{-1}.)	Stover yield (kg fed^{-1}.)	Relative in-crease in grain yield over the control
Hybrids	Boron										
S.C. 124	B_0	169.333	11.00	11.00	9.00	4.31	33.26	926.33	1781.67	1721.33	--
	B_1	173.67	12.00	12.33	9.93	4.38	35.64	1171.33	2076.67	2319.00	26.4
	B_2	186.00	16.67	14.80	11.40	4.42	38.21	1987.33	3308.33	2517.00	114.5
	B_3	186.33	20.33	15.00	13.00	4.45	39.47	2189.33	3475.33	2563.33	136.3
S.C. 168	B_0	174.00	7.67	9.80	7.27	4.42	27.49	380.33	775.00	1928.67	--
	B_1	178.33	9.33	11.20	8.73	4.50	31.21	671.00	1268.33	2081.67	76.4
	B_2	185.67	12.67	11.80	12.60	4.58	31.98	1441.00	2513.00	2315.67	278.9
	B_3	190.00	16.00	12.00	16.00	4.64	32.24	1895.67	3112.33	2465.33	398.4
T.W.C. 310	B_0	189.33	6.00	10.40	6.80	4.05	28.05	285.33	587.00	1740.67	--
	B_1	208.33	9.13	11.60	8.07	4.16	30.66	581.00	1074.67	2233.33	103.6
	B_2	211.67	9.67	13.27	8.53	4.22	32.22	721.67	1238.67	2467.00	152.9
	B_3	211.67	12.33	14.73	11.00	4.24	34.08	1408.00	1301.67	2696.00	393.5
T.W.C .324	B_0	190.67	12.00	10.00	8.80	4.35	32.30	851.00	1525.33	1978.67	--
	B_1	202.00	15.00	13.80	9.20	4.42	32.94	1186.00	2043.33	2296.67	39.4
	B_2	210.67	16.00	15.00	9.93	4.50	33.84	1438.00	2412.33	2538.33	69.0
	B_3	217.33	20.00	16.13	11.00	4.59	34.36	1891.00	3000.00	2731.00	122.2
T.W.C .352	B_0	162.67	9.33	8.80	10.13	4.39	25.39	669.00	1352.33	1882.67	--
	B_1	166.33	10.67	11.47	12.00	4.48	27.52	973.33	1759.33	1984.67	45.5
	B_2	172.00	12.67	13.00	12.20	4.58	29.46	1208.33	2064.00	2146.67	80.6
	B_3	174.67	15.33	13.00	13.13	4.61	30.16	1766.67	2816.33	2426.00	164.1
F test		*	--	**	**	--	**	**	**	**	--
LSD at 5%		6.75.	N.S.	0.49	0.91	N.S.	0.91	72.54	125.94	115.59	--

Moreover, **Mozafar** Institute of Plant Sciences, Swiss Federal Institute of Technology (ETHZ), 8092, **Zurich, Switzerland (1987)** investigated the effect of various B concentrations in nutrient solution on ear formation and yield components of two maize (*Zea mays* L.) hybrids (Mutin and Carlos Semu 201) in sand culture. Who reported that interruption in the B supply (from one week prior to tasseling until maturity) curtailed the normal development of the ear, which was more severe in Mutin cv. than in Carlos Semu 201 maize hybrid. The data indicate that the B requirement of the two

hybrids tested is different and is higher than the most-cited values. The higher critical B levels observed for stover, total and ear production indicate that B plays an important role in the storage of assimilates in maize.

Concerning the data of the relative increase in grain yield over the control, foliar application by boron at the highest level (69 ppm) produced the higher values of S.C. 168 (398.4%) and T.W.C. 310 (393.5%) maize hybrids. However, the maximum values of grain yield/fed was obtained from S.C. 124 maize hybrid when boron application by the highest level (69 ppm). This means that S.C. 168 and T.W.C. 310 maize hybrid is highly responsees to boron application.

In this regard, **Aydyn et al (2003)** mentioned that grain yield increased significantly up to 2 kg B ha^{-1} and decreased with higher B levels in Kiziltan cultivar. Also, **Sittichai et al (2010**) they reported that B benefits the production of hybrid maize grain, with the primary concern being successful pollination and fertilization. and **Shoman et al (2013)** they indicated that the interaction between maize cultivars and boron spraying was significantly affected on ear length, No. of grains/ ear, grains weight/ ear, 1000-grain weight and yields of biological and grain in both seasons.

Conclusion

In general, it can be concluded that in maize hybrid, yield components are positively related with grain yield per Fadden. It could be concluded that, a single cross (SC 124) and boron foliar, at concentration of 69 ppm are recommended annually for high maize yield and yield components under semi-arid conditions at Siwa Oasis**.**

REFERENCES

Abd El-Lateef A.A. and Bughdady A.M. 2018. Response of some white corn hybrids (*Zea mays* L.) hybrids to bio-mineral fertilizers application under Al-Frafra Oasis conditions. **Annals of Agric. Sci. Moshtoher., 56 (1), 1-12.**

Abd El-Lateef A.A. and Bughdady A.M. 2017. Effect of bio-mineral fertilizers on the yield and its productivity of some yellow corn hybrids (*Zea mays* L.) under Al-Frafra Oasis conditions, Egypt. **Egypt. J. Appl. Sci., 32 (12), 293-306.**

Abdou E.M.A., Ibrahim A.A., Ghanem S.A.I., Zeiton O.A.A. and Omar A.E.A. 2012. Effect of planting density and nitrogen fertilization on yield and its attributes of some yellow maize hybrids. **Zagazig J. Agric. Res., 39(6), 1033-1046**

Abdul Aziz, M.D., Rahman A.K., Chakma R., Ahmed M. and Ahsan A.F. 2011. Performance of bari hybrid maize varieties in the Hilly areas of Bangladish. **J. Expt. Bio. Sci. 2(2), 25-28.**

Ahmad, A.H., Bukhsh M.A., Riaz A., Iqbal Javaid, Hussain S., Rehman Atique ur and Ishaque M. 2011. Potassium application reduces bareness in different maize hybrids under crowding stress conditions. **Pak. J. Agri. Sci., 48 (1), 41-48.**

Ahmad, W., Niaz A., Kanwal S., Rahmatullah and Khalid Rasheed M. 2009. Role of boron in plant: A review. **J. Agric. Res., 47(3), 329-338.**

Akram, M., Ashraf M.Y., Rashid A., Rafiq M., Ahmad I. and Iqbal Javed. 2010. Allometry and yield components of maize (*Zea mays* L.) hybrids to various potassium levels under saline conditions Arch. **Biol. Sci., Belgrade, 62 (4), 1053-1061.**

Attia, A.M. and El-Dissoky R.A. 2016. Yellow Maize Crop Response to Potassium and Boron Fertilization under Upper Egypt Conditions. **J. Soil Sci. and Agric. Eng., Mansoura Univ., 7 (12), 895 – 902.**

Awadalla A. and Morsy A.S.M. 2016. Response of some yellow Maize crosses to N-fertilizer rates and plant densities at Toshka Region. **Egypt. J. Agron. 38 (3), 337-354.**

Aydyn, G.N., Mehmet Alpaslan, Ali Unal 2003. Effects of boron fertilization on the yield and some yield components of bread and durum wheat. **Turk, J. Agric (27), 329-335.**

Brown P.H., Bellaloui N.M.A. Wimmer, E.S. Basil; Ruiz J., Hu H., Pfeffer H., Dannel D. and Romheld V. 2002. "Boron in Plant Biology". **Plant Bio., 4, 205-223.**

El-Gizawy, N.Kh.B. and Salem H.M. 2010. Influence of nitrogen sources on yield and its components of some maize varieties. **World. J. of Agric. Sci. 6(2), 218-223.**

Hafez, M.R., El Sagan M.A.M. and Gomaa S.S. 2015. Improvement Production of Eggplant under Siwa Conductions. **Europ. J. of Acad. Essays., 2 (11), 28-38.**

Hassan, M.M.M., El-Ghonemy M.A.M. and Aly R.S.H. 2008. Response of some maize single hybrids to plant density under different Egyptian environmental conditions. **Minufiya J. Agric. Res., 33(2), 427 – 443.**

Hassan, Kh.H. 1999. Response of maize cultivars to plant distribution under different salinity con-

ditions at Siwa Oasis. **Annals Agric. Sci., Ain shams Univ., Cairo, 44(1), 189-199.**

Hassan, Kh.H. 1998. Response of some maize cultivars to early planting dates under saline conditions at Siwa Oasis. **Annals Agric. Sci., Ain shams Univ., Cairo, 43(2), 391-401.**

Hassaan, M.A. 2018. Response of some yellow Maize hybrids (*Zea mays* L.) to sowing date under Toshka conditions. **J. Plant Prod. Mansoura Univ., 9 (6), 509-518**

Li, Y. and Liang H. 1997. Soil boron content and the effect of boron application on yield of maize, soybean, rice and sugarbeet in Heilonjiang Province, PR China. In Bell RW, Rerkasem B. (eds) boron in soil and plants. Kluwer, Dordrecht, the Netherlands, **pp 17-21.**

Maria Pilar, H. and Johnson R.R. 1980. High temperature stress and pollen viability of maize. **Crop Sci. 20, 796-800.**

Marschner, H. 1995. "Mineral Nutrition of Higher Plants". Academic Press Inc. (London) LTD, **889p.**

Mekki, B.E. 2015. Effect of boron foliar application on yield and quality of some sunflower (*Helianthus annuus* L.) cultivars. **J. of Agric. Sci. and Tech., 5, 309-316.**

Mengle K. and Kirkby E. A. 2001. "Principles of plant nutrition". (5th ed.), Kluwer Acad. Publ, Dordrecht. **pp. 621-638.**

Mozafar, A. 2008. Effect of Boron On Ear Formation And Yield Components Of Two Maize (*Zea mays* L.) hybrids**. J. of Plant Nutri., 10, 319-332.**

Muchow, R.C. 1990. Effect of high temperature on grain growth in field grown maize. **Field Crops Res. 23, 145-158.**

Ray, J.D. 1999. Physiological roles and transport mechanism of boron: perspective from plants. **Eur. J. Physiol. 456, 671-677.**

Sittichai, L., Benard D., Sansanee J. and Benjavan R. 2010. Boron deficiency in maize. **Plant and Soil 342(1), 207-220.**

Shagholi, Sh., Nemati N. and Silspur M. 2013. Effect of nitrogen fertilizer and spray the element boron some agronomic traits of corn (*Zea mays* L.) hybrid (SC704) in Varamin, **Iran., Annals of Biol. Res. 4 (3), 37-40.**

Shoman, H.A., Dawood R.A., Abdel-Motagally F.M.F. and Abd El-Gawad M.A. 2013. Response of Some Maize Cultivars To Potassium And Boron Fertilization Under New Valley Conditions. **Assiut J. of Agric. Sci., 43(4), 30-48.**

Snedecor, G. W. and Cochran, W.G. 1990. Statistical met- hods 7th Ed. Iowa State Univ. press, Ames- Iowa, USA., **507 p.**

Soliman, M.S.M. and Barakat A.A. 2006. Growth and yield analysis of two inbred lines and sixteen crosses of white maize cultivars (*Zea mays* L.) cultivated in Egypt. J**. of Appl. Sci. Res. 2 (11), 936-941.**

Walden, D.B. 1993. In vitro pollen germination. The Maize Handbook, **pp. 723-724,** Springer, New York, Berlin Heidelberg.

Wang Q., Lu L., Wu X., Li Y. and Lin J. 2003. Boron influences pollen germination and pollen tube growth in *Picea meyeri*, tree. **Physiol. 23, 345-351.**

المؤتمر الرابع عشر لبحوث التنمية الزراعية،
كلية الزراعة، جامعة عين شمس، مارس 2019، القاهرة، مصر
مجلد(27)، عدد (1)، عدد خاص مارس، 281-287، 2019
Website: http://strategy-plan.asu.edu.eg/AUJASCI/

إستجابة بعض أصناف الذرة الشامية للرش بالبورون تحت ظروف واحة سيوه

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Received 20 February, 2019, Accepted 31 March, 2019

الموجـــــز

أجريت تجربتان حقليتان بمنطقة بهى الدين بواحه سيوه – مصر خلال موسمى 2017 ، 2018 بهدف دراسة تأثير الرش بالبورون بمعدلات 23 ، 46 و 69 جزء فى المليون بالاضافه الى معاملة الكنترول (ماء فقط) على المحصول ومكوناته لخمسه هجن من الذرة الشامية (هجين فردى ابيض 124، هجين فردى اصفر 168، هجين ثلاثى ابيض جيزة 310 ، هجين ثلاثى ابيض 324 ،هجين ثلاثى اصفر 352)، فى تصميم الشرائح المتعامدة حيث احتلت معاملات الرش في الشرائح الرأسيه وهجن الذره الشاميه في الشرائح الآفقيه فى ثلاثة مكررات. وقد أوضحت النتائج المتحصل عليها أن تأثير الرش بالبورون مع هجن الذرة الشامية كان معنوياً على ارتفاع النبات، عدد الحبوب/صف ،عدد الصفوف /كوز وقطر الكوز، وزن ال 100 حبة ومحصول الحبوب والكيزان ومحصول الحطب. سجل الهجين االفردى 124 تفوق عن الهجن الاخري فى صفات وزن ال 100 حبة ومحصول الحبوب والكيزان بالمقارنة بالهجن الاخري، بينما تفوق الهجين الفردى الاصفر 168 فى صفه قطر الكوز وبينما تفوق الهجين الثلاثى الابيض 324 فى صفات عدد الحبوب/ صف وطول الكوز ومحصول الحطب، بينما تفوق الهجين الثلاث الاصفر 352 فى صفات عدد الحبوب/ كوز وقطر الكوز واخيرا تفوق الهجين الثلاثى الابيض 310 فى صفه ارتفاع النبات بينما لم تكن الاختلافات معنويه بينه وبين هجين324 فى ذات الصفة (ارتفاع النبات). أدى زيادة معدل الرش بالبورون إلى69 جزء في المليون إلى زيادة معنوية فى كل الصفات المدروسة. بينما كان تأثير التفاعل على المحصول ومكوناته معنويا فى كل الصفات تحت الدراسه ما عدا (عدد الحبوب/صف وقطر الكوز).

وبناء على النتائج المتحصل عليها نوصى باستخدام الرش بالبورون بتركيز 69 جزء فى المليون مع الهجين الفردي 124 من الذرة الشامية للحصول على أفضل محصول من الحبوب والكيزان للذره الشاميه تحت ظروف واحه سيوه.

الكلمات الدالة: الذرة الشامية، الرش بالبورون، واحة سيوة

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